American River College MATH 402: Calculus III Quiz 6: 13.4

Name:	
Student ID:	
Signature:	

- Show all work
- No notes, books, or calculators allowed.
 - 1. (2 points) Explain why the following integral does not make sense.

$$\int_{0}^{1} \int_{0}^{z} \int_{x+y}^{2x+y} e^{x+y+z} \, dz \, dy \, dx$$

The second integral is with respect to y. Any bounds for y, in this case, can only be functions of x (or constants). We see that the upperbound for the second integral is y = z which violates the type of function that can be a bound for the second integral.

2. (6 points) Set up the bounds and order of integration in rectangular coordinates for the triple integral given below. DO NOT EVALUATE

$$\int \int \int_{D} y^2 \, dV \qquad D = \left\{ x^2 + y^2 = 4, 0 \le z \le y \right\}$$

Note that the restrictions on z implies that $y \leq 0$.

$$\int_{-2}^{2} \int_{0}^{\sqrt{4-x^2}} \int_{0}^{y} y^2 \, dz \, dy \, dx$$

3. (2 points) Describe the projection of the solid of integration onto the xy-plane.

$$\int_{0}^{1} \int_{0}^{\sqrt{1-x^{2}}} \int_{2}^{4} f(x, y, z) \, dz \, dy \, dx$$

The quarter circle of radius 1 in the first quadrant. The second integral restricts us to the half of the circle such that $y \leq 0$. The outer integral restricts us to values of x from 0 to 1. In this problem, the bounds of z have no bearing on the projection.